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ENTOMOLOGY.[1]

Dimorphism in Cynipidæ.—The first record in this country, if not elsewhere, of the actual proof of dimorphism in the Cynipidæ, was by the editor of this department, in the American Naturalist for 1873 (Vol. vii, p. 519), where the common wooly oak gall which produces in spring the bisexual *Cynips q-operator*, was shown to have a larger asexual dimorphic form (our *C. q-operatola)* that develops in an autumnal pip-like gall formed between the cupule and the fruit. Walsh had previously given good reasons for the belief that *C. q-aciculata* was the autumnal agamic dimorphous form of *C. q-spongifica (Am. Entomologist* ii, p. 330, ff.), and Mr. H. F. Basset has, following Adler's interesting experiments in Europe, suggested the probable dimorphic connection of several of our vernal galls which produce bisexual individuals with autumnal forms which produce larger, asexual flies. Dr. Adler continues his successful study and experiment in this direction, and gives in the *Zeitschrift für wissens. Zool.* (Vol. xxxv, p. 151), the results obtained so far in his researches, and the number of species in which the occurrence of dimorphic forms has been proven is already quite considerable. The following is a list thereof, the name in the first column referring to the agamic, that in the second to the bisexual generation:

1. *Neuroterus lenticularis* = *Spathegaster baccarum*
2. " *læviusculus* = " *albipes*
3. " *numismatis* = " *vesicatrix*
4. " *fumipennis* = " *tricolor*
5. *Aphilotrix radicis* = *Andricus noduli*
6. " *sieboldi* = " *testaceipes*
7. " *corticis* = " *gemmatus*
8. " *globuli* = " *inflator*
9. " *collaris* = " *curvator*
10. " *fecundatrix* = " *pilosus*
11. " *callidoma* = " *cirratus*
12. " *malpighii* = " *nudus*
13. " *autumnalis* = " *ramuli*
14. *Dryophanta scutellaris* = *Spathegaster taschenbergii*
15. " *longiventris* = " *similis*
16. " *divisa* = " *verrucosus*
17. *Biorhiza aptera* = *Teras terminalis*
18. " *renum* = *Trigonaspis crustalis*
19. *Neuroterus ostreus* = *Spathegaster aprilinus ?*

Of Nos. 1–13, the first form appears in March until May, the second in June until July, or in some species in August. In Nos. 15–19 the agamic generation appears from October until March, and the sexual generation in May until July. In No. 14 the first form appears in January until February, the second in May until June.

Very remarkable is the fact that in some closely allied species no alternate generation seem to occur. They are the following species: *Aphilotrix seminationis, marginalis, quadrilineatus* and *albopunctatus.*

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[1] This department is edited by Prof. C. V. Riley, Washington, D. C., to whom communications, books for notice, etc., should be sent.

BLEPHAROCERIDÆ.—The very interesting discovery, by Dr. Fritz Müller, of the earlier states of *Paltostoma torrentium*, has been followed in rapid succession by that of other Blepharocerid larvæ and pupæ in various parts of the globe, and it seems that most, if not all, species of Blepharoceridæ agree in the mode of development and in habit. Thus Dr. F. Brauer finds that pupæ from the mountain streams at Meran, Tirol, are closely allied to those of *Paltostoma torrentium*, and that they are, in all probability, those of *Blepharocera fasciata.* We have for some time had in our collection a number of pupæ which were found six or seven years ago in the month of June by Mr. H. G. Hubbard near Fitchburg, Mass., and which we at once recognized as of some species of Blepharocera, upon seeing a photograph of the figures by Fritz Müller in Dr. Hagen's possession. The pupæ occurred in a mountain stream on a flat rock over which ran swiftly a thin sheet of water. The surface of the rock was coated with the pupæ. Another species (*Liponeura brevirostris* Löw) has been described in the larva and pupa states by H. Dewitz in the Berlin *Entomologische Zeitschrift* (Vol. xxv, p. 61–66). The latest contribution to the natural history of these interesting Diptera we owe to Dr. A. Wierzejski of the University of Krakau, who gives in the *Zoologischer Anzeiger* (No. 81, p. 212–216) full descriptions of the larva and pupa of another Blepharocerid. He found them in a mountain brook in the Tatra mountains, adhering to the rocks in the swiftest part of the current. The larvæ are able, by means of the six suctorial disks on the ventral side not only to withstand the swift current but also to move freely about, usually sidewise. Dr. W. did not succeed in rearing the perfect insect, as the larvæ and pupæ soon perished when confined in standing water; but from examination of the pupæ he is confident that his species is very nearly allied to *Blepharocera fasciata.* He promises further investigation of the subject, and especially on that most interesting discovery made by Dr. Fritz Müller, viz: the occurrence of dimorphic females in the species of Itajahi, the two forms of the female widely differing from each other in the organs of the mouth, the size of the eyes and the structure of the last tarsal joint. Dr. Müller's full paper on the metamorphosis of *Paltostoma torrentium* and the anatomy of its larva will be shortly published in the "Archivos do Museu Nacional do Rio de Janeiro."

For those not familiar with the descriptions already given of the larvæ and pupæ of this interesting group of Diptera we would add that the larva is one of the most remarkable in the insect world. It has apparently but six joints to the body, and its general appearance recalls that of *Asellus*, the joints being, however, deeply cut on the sides and widely separated. The six-jointed character is, however, only apparent, as the last joint is evidently composed of three, and the first joint is also evidently composed of several, the head being distinctly separated beneath. The sides of the joints appear tuberculous and each joint has, indeed, a pair of separate, decurved, cylindrical and pointed tubercles issuing from it, resembling six pairs of legs, and used doubtless to lift the larva from its attachment when movement is desired. Medio-ventrally there is a series of six circular, elevated sucking disks, each having a series of tracheal filaments on the side, which filaments also doubtless aid in suction. The pupa is very flat ventrally, convex dorsally, with two conical horns on the anterior end, each composed of four compressed laminæ, which easily separate, and which are the thoracic tracheæ, corresponding to those of other aquatic dipterous pupæ, as in the common mosquito. The pupæ collected in Massachusetts are somewhat smaller than Fritz Müller's specimens, but structurally identical. They strongly recall in color and general appearance some of our smaller Gyrinid beetles.

BRAULA CŒCA NOT PARTICULARLY INJURIOUS TO THE HONEY BEE.—Mr. J. Fedarb has in Hardwicke's *Science Gossip* for May 2, 1881, an article on *Braula cæca,* that curious dipterous parasite of our honey bee. He asserts that there can be no doubt that the damage done by it is generally overestimated, and that the ravages of other hidden guests within the apiary are often wrongly attributed to Braula, the real authors of the mischief being overlooked. Braula is no doubt annoying to the bee it infests, but only when it occurs in very great numbers has it an injurious effect on the bee colony. Mr. Fedarb finds that Braula was unknown to the ancient authors on the honey bee, while even such careful observers of a more recent time as Swammerdam and Huber do not mention it at all. The parasite may have only lately developed the habit of living on the honey bee, being present formerly under other conditions, or it may have spread recently from some restricted point of the globe.

ECONOMIC ENTOMOLOGY IN ENGLAND.—Miss L. A. Ormerod's "Notes of Observations of Injurious Insects" for the year 1880 has been kindly sent us by the authoress. Of the numerous instances of insect injury during that year in Great Britain, none is more remarkable than that of the wide-spread damage caused by various species of Tipulid larvæ to wheat, barley, oats, cabbage, potatoes, peas and strawberries. The larvæ gnaw away the outer part of the plant just at the surface of the ground or a little beneath it, thus weakening or in many instances killing the plants. Tipulid larvæ are very plentiful in many parts of our own country, and occasionally inflict some damage to rich meadows, but no case of injury to field and garden crops has so far been reported to us. Miss Ormerod is doing an admirable work, and we are glad to see that she is meeting with success and encouragement.

THE CULTIVATION OF PYRETHRUM AND MANUFACTURE OF THE POWDER.—In accordance with an announcement in the March number of the NATURALIST, the editor of this department has sent out the seed of two species of Pyrethrum, viz: *P. roseum* and *P. cinerariæfolium*, to a large number of correspondents in different parts of North America. Every mail brings us some inquiries for further particulars and directions to guide in the cultivation of the plant and preparation of the powder. We have concluded, therefore, that such information as is obtainable on these heads will prove of public interest, and we shall ask Professor Bessey's pardon for trenching somewhat on his domain.

There are very few data at hand concerning the discovery of the insecticide properties of Pyrethrum. The powder has been in use for many years in Asiatic countries south of the Caucasus mountains. It was sold at a high price by the inhabitants, who successfully kept its nature a secret until the beginning of this century, when an Armenian merchant, Mr. Jumtikoff, learned that the powder was obtained from the dried and pulverized flower-heads of certain species of Pyrethrum growing abundantly in the mountain region of what is now known as the Russian province of Transcaucasia. The son of Mr. Jumtikoff began the manufacture of the article on a large scale in 1828, after which year the Pyrethrum industry steadily grew, until to-day the export of the dried flower-heads represents an important item in the revenue of those countries.

Still less seems to be known of the discovery and history of the Dalmatian species of Pyrethrum (*P. cinerariæfolium*), but it is probable that its history is very similar to that of the Asiatic species. At the present time the Pyrethrum flowers are considered by far the most valuable product of the soil of Dalmatia.

There is also very little information published regarding either the mode of growth or the cultivation of Pyrethrum plants in their native home. As to the Caucasian species we have reasons to believe that they are not cultivated, at least not at the present time, statements to the contrary notwithstanding.[1] The well-known Dr. Gustav Radde, director of the Imperial Museum of Natural History at Tiflis, Transcaucasia, who is the highest living authority on everything pertaining to the natural history of that region, wrote us recently as follows: "The only species of its genus, *Pyrethrum roseum*, which gives a good, effective insect powder, is nowhere cultivated, but grows wild in the basal-alpine zone of our mountains at an altitude of from 6000 to 8000 feet." From this it appears that this species, at least, is not cultivated in its native home, and Dr. Radde's statement is corroborated by a communication of Mr. S. M. Hutton, Vice-Consul General of the U. S. at Moscow, Russia, to whom we applied for seed of this species. He writes that his agents were not able to get more than about half a pound of the seed from any one person. From this statement it may be inferred that the seeds have to be gathered from the wild and not from the cultivated plants.

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[1] Report Comm. of Patents, 1857, Agriculture, p. 130.

As to the Dalmatian plant it is also said to be cultivated in its native home, but we can get no definite information on this score, owing to the fact that the inhabitants are very unwilling to give any information regarding a plant the product of which they wish to monopolize. For similar reasons we have found great difficulty in obtaining even small quantities of the seed of *P. cinerariæfolium* that was not baked or in other ways tampered with to prevent germination. Indeed, the people are so jealous of their plant that to send the seed out of the country becomes a serious matter, in which life is risked. The seed of *Pyrethrum roseum* is obtained with less difficulty, at least in small quantities, and it has even become an article of commerce, several nurserymen here, as well as in Europe, advertising it in their catalogues. The species has been successfully grown as a garden plant for its pale rose or bright pink flower-rays. Mr. Thomas Meehan, of Germantown, Pa., writes us: "I have had a plant of *Pyrethrum roseum* in my herbaceous garden for many years past, and it holds its own without any care much better than many other things. I should say from this experience that it was a plant which will very easily accommodate itself to culture anywhere in the United States." Peter Henderson, of New York, another well-known and experienced nurseryman, writes: "I have grown the plant and its varieties for ten years. It is of the easiest cultivation, either by seeds or divisions. It now ramifies into a great variety of all shades, from white to deep crimson, double and single, perfectly hardy here, and I think likely to be nearly everywhere on this continent." Dr. James C. Neal, of Archer, Fla., has also successfully grown *P. roseum* and many varieties thereof, and other correspondents report similar favorable experience. None of them have found a special mode of cultivation necessary. In 1856 Mr. C. Willemot made a serious attempt to introduce and cultivate the plant[1] on a large scale in France. As his account of the cultivation of Pyrethrum is the best we know of we quote here his experience in full, with but few slight omissions: "The soil best adapted to its culture should be composed of a pure ground, somewhat siliceous and dry. Moisture and the presence of clay is injurious, the plant being extremely sensitive to an excess of water, and would in such case immediately perish. A southern exposure is the most favorable. The best time for putting the seeds in the ground is from March to April. It can be done even in the month of February if the weather will permit it. After the soil has been prepared and the seeds are sown they are covered by a stratum of ground mixed with some vegetable mould, when the roller is slightly applied to it. Every five or six days the watering is to be renewed, in order to facilitate the germination. At the end of about thirty or forty days the young plants make their appearance, and as soon as they have gained strength enough they are transplanted at a distance of about six inches from each other. Three months after this operation they are transplanted again at a distance of from fourteen to twenty inches, according to their strength. Each transplantation requires, of course, a new watering, which, however, should only be moderately applied. The blossoming of the Pyrethrum commences the second year, toward the end of May, and continues to the end of September." Mr. Willemot also states that the plant is very little sensitive to cold, and needs no shelter, even during severe winters.

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[1] Mr. Willemot calls his plant *Pyrèthre du caucase* (*P. Willemoti* Duchartre), but it is more than probable that this is only a synonym of *P. roseum*. We have drawn liberally from Mr. Willemot's paper on the subject, a translation of which may be found in the Report of the Commissioner of Patents for the year 1861, Agriculture, pp. 223–331.

The above-quoted directions have reference to the climate of France, and as the cultivation of the plant in many parts of North America is yet an experiment, a great deal of independent judgment must be used. The plants should be treated in the same manner as the ordinary Asters of the garden or other perennial Compositæ.

As to the Dalmatian plant, it is well known that Mr. G. N. Milco, a native of Dalmatia, has of late years successfully cultivated *Pyrethrum cinerariæfolium* near Stockton, Cal., and the powder from the California-grown plants to which Mr. Milco has given the name of "Buhach" retains all the insecticide qualities and is far superior to most of the imported powder as we know from experience. Mr. Milco gives the following advice about planting—advice which applies more particularly to the Pacific coast: "Prepare a small bed of fine, loose, sandy, loamy soil, slightly mixed with fine manure. Mix the seed with dry sand and sow carefully on top of the bed. Then with a common rake disturb the surface of the ground half an inch in depth. Sprinkle the bed every evening until sprouted; too much water will cause injury. After it is well sprouted, watering twice a week is sufficient. When about a month old, weed carefully. They should be transplanted to loamy soil during the rainy season of winter or spring."

Our own experience with *P. roseum* as well as *P. cinerariæfolium* in Washington, D. C., has been so far quite satisfactory. Some that we planted last year in the fall came up quite well in the spring and will perhaps bloom the present year. The plants from sound seed which we planted this spring are also doing finely, and as the soil is a rather stiff clay and the rains have been many and heavy, we conclude that Mr. Willemot has overstated the delicacy of the plants.

In regard to manufacturing the powder, the flower heads should be gathered during fine weather when they are about to open, or at the time when fertilization takes place, as the essential oil that gives the insecticide qualities reaches, at this time, its greatest development. When the blossoming has ceased the stalks may be cut within about four inches from the ground and utilized, being ground and mixed with the flowers in the proportion of one third of their weight. Great care must be taken not to expose the flowers to moisture, or the rays of the sun, or still less to artificial heat. They should be dried under cover and hermetically closed up in sacs or other vessels to prevent untimely pulverization. The finer the flower-heads are pulverized the more effectually the powder acts and the more economical is its use. Proper pulverization in large quantities is best done by those who make a business of it and have special mill facilities. Lehn & Fink, of New York, have furnished us with the most satisfactory powder. For his own use the farmer can pulverize smaller quantities by the simple method of pounding the flowers in a mortar. It is necessary that the mortar be closed, and a piece of leather through which the pestle moves, such as is generally used in pulverizing pharmaceutic substances in a laboratory, will answer. The quantity to be pulverized should not exceed one pound at a time, thus avoiding too high a degree of heat, which would be injurious to the quality of the powder. The pulverization being deemed sufficient, the substance is sifted through a silk sieve, and then the remainder, with a new addition of flowers, is put in the mortar and pulverized again.

The best vessels for keeping the powder are fruit jars with patent covers or any other perfectly tight glass vessel or tin box.

In the next number we will give some account of the different ways in which the powder may be used to destroy insects.

TREES ATTRACTIVE TO BUTTERFLIES.—Mrs. A. E. Bush, of San José, Cal., writes: "I have been to Monterey, and was fortunate enough to see the 'butterfly tree,' or trees, as there are three of them. These trees are the Monterey pine (*Pinus insignis* Dougl.), and are probably over one and a half feet in diameter, and completely covered with live butterflies. To say that there were as many butterflies as leaves upon the trees would not be a very great exaggeration. I saw them in the morning when it was cool and they could not fly very well, and picked up a dozen from the grass in a few seconds. A lady resident informed me that for the twelve years she had lived there the appearance had been the same."

HUDSON BAY LEPIDOPTERA.—Mr. J. Jenner Weir, in the May number of the *Entomologist* (London, England), has an article on the Lepidoptera Rhopalocera of Hudson's bay, drawn from specimens obtained in two years' collecting in that dreary region by Mr. Walton Haydon. There are seventeen species of butterflies belonging to ten genera, all the genera but one occurring in Great Britain. The list includes *Vanessa antiopa, Pyrameis car-*

dui, *P. atalanta*, *Pieris oleracea*, *Argynnis atlantis*, *A. myrina*, *Vanessa milberti*, *Grapta faunus*, *Lycæna lucia*, *Colias erytheme*, var., *keewaydin*, *Argynnis lapponica*, *A. tarquinius*, *A. bellona*, *Papilio glaucus* var. *turnus*, *Limenitis arthemis* var. *lamina*, and *Phyciodes tharos*. Mr. Weir concludes his paper with the following remarks: "The collection of which I have now given a description, small as it is, is not wanting in interest. It is surprising to contemplate the time which must have elapsed since the three identical with European species had a common ancestor, and yet the difference now existing is too slight to consider them even varieties of each other. A former connection with Europe by the Faröe islands, Iceland and Greenland no doubt existed, and during one of the periods of mild Arctic climate the transmission of species from one continent to another was effected. We are so in the habit of calling this hemisphere the old world, that it does not occur to us that it is just as likely that *Vanessa antiopa* passed from America to Europe, as that the converse was the case."

Unfortunately the three species referred to (*Vanessa antiopa*, *Pyrameis cardui* and *P. atalanta*) are the very poorest that could be chosen as indicating length of time required for variation of forms that have become separated by wide expanse of ocean. They are cosmopolitan butterflies, all known to be capable of extended flight, and it seems to us that the constancy they exhibit in different quarters of the globe is explicable rather on frequent and recent migration from one part of the world to another.

TRADE IN INSECTS.—It is a well known fact that sixty or more years ago exorbitant prices were paid for rare insects, or at least for species that were considered rare. Since that time the market price for insects has been constantly on the decline, and at the present time a vast number of species of the two favorite orders, Lepidoptera and Coleoptera, can be had through reliable dealers at very reasonable prices, and generally correctly determined. Still there are some exceptions to this rule, and a recent auction sale in London of the collection of the late J. Aspinwall Turner, M.P., shows that the price commanded by the gorgeous species of the Goliath beetles is scarcely inferior to that paid by collectors in the days of Drury and Donovan. The following are some of the prices obtained at that auction sale: lot 61, 2 *Euchirus dupontianus*, 2 *E. macleayi*, 3 *E. cantori* and 3 *E. hardwickii* brought £8; lot 91, 2 *Goliathus giganteus* £7; lot 92, 1 *Goliathus giganteus*, 1 *G. kirkii* and 1 var.? *G. cacicus* ♀ £20; 1 *Ischnoscelis dohrni* £10; one pair of *Goliathus fornassinii* £24. It might be mentioned in this connection that at the beginning of this century Donovan paid for 1 *Goliathus giganteus* the handsome sum of 12½ guineas.

ANTS INJURIOUS IN ARIZONA.—Mr. H. H. Rusby, of Clifton, Arizona, sends us a rather doleful account of the destruction wrought by ants in that Territory. He says the country is one vast ant colony, and that the ants prove the greatest drawback to successful agriculture in the more arable portions. Several species seem to be thus troublesome, and until they are better known and the habits of the different species studied, it will be impossible to suggest a rational mode of warfare against them.

LARVÆ OF COLEOPTERA.—Professor F. G. Schaupp continues, in the Bulletin of the Brooklyn Entomological Society, his descriptions of larvæ of Coleoptera. In No. 10, Vol. III, of said Bulletin, he gives a plate with illustrations representing the larvæ of *Platynus extensicollis*, *Chlænius leucoscelis*, *Pterostichus lucublandus*, *P. mutus* and *Staphylinus vulpinus*.

COVERING OF EGG-PUNCTURE MISTAKEN FOR DORTHESIA.—In hastily looking over the collection of the late Dr. Fitch recently, we were somewhat amused to recognize the white and ribbed waxy material covering the egg-punctures of *Enchophyllum binotatum* labeled as *Dorthesia viburni* and *D. celastri*. This covering does bear a superficial resemblance to the exudations of Dorthesia, though a glance suffices to show that it has no structure connected with it. We cannot find that any such species of Dorthesia were described by Fitch, though Glover refers to his *D. celastri* as found on Celastrus (Agricultural Report, 1876, p. 45). Mr. Lintner, the present State entomologist of New York, thinks that the species may possibly have been published in fugitive articles in the *Country Gentleman*, but we have no means of ascertaining the facts.

MR. H. KEENAN, of Quaker City, Ohio, sends us the saw-fly, *Dolerus unicolor* (Beauv.), the ♀ of which is described as *arvensis* by Say, with a statement of its injuries to the fruit buds of pear trees by eating holes therein, the saw-flies occurring in vast numbers around the trees. This is the first case that has come to our knowledge of a Tenthredinid in the imago state injuring vegetation, and it is possible that some other insect may have been the real depredator.

SUPPOSED ARMY WORM IN NEW YORK AND OTHER EASTERN STATES.—Numerous accounts have been published in the daily and weekly journals of the East, announcing wide-spread injury by the "army worm." This injury has occurred in New Jersey, on Long Island and in most of the grazing sections of New York, especially in St. Lawrence, Franklin, Jefferson, Oswego and Hamilton counties. Professor J. A. Lintner, State Entomologist of New York, has published the fullest account of its ravages in the Albany papers, which have been quoted in the *Country Gentleman*. Mr. J. Q. Adams, of Watertown, N. Y., writes to us under date of May 24th, as follows:

> "Many hill pastures hereabouts are being ruined by what is called the army worm and while I cannot doubt but that it is *Leucania unipuncta* from its work, still I wish confirmation of the fact by an authority. My search in the fields has developed only a black headed, black spotted, smoky colored, naked worm that builds a nidus of its

own chips, which are pure green, and lives either close upon or below the surface of the soil. I know what the mature army worm is like from my books, but I find no mention of the immature larvæ. If you will favor me with a line or pamphlet describing the immature worm, you will help me out of the dilemma. Doubts suggest themselves because of the silken nidus which seems to me inconsistent with migratory habits.

The work of the pests, which I suppose has been checked the past week by the heavy rains we have had, is already considerable, some fields as large as forty acres being ruined and others showing only dead spots of a rod or two square. It is confined to the limestone ridges and to pastures. Are all our other pastures in danger? This is a dairy country and great harm will result if the work continues."

There seems to have been considerable doubt as to whether these worms were the true army worm or not. From specimens that were forwarded to us by Mr. Lintner and Mr. Adams, it would seem that there are two different species concerned in the work. The principal and larger one is the larva of *Nephelodes violans* Guen. We have known the insect since 1871, and it is tolerably common all over the eastern portion of the country. Walsh refers to it in an unpublished note as being found in meadows under stones at Rock Island, Ill. We have found it on a number of occasions since 1871 in different parts of Illinois and Missouri, usually hiding under planks or stones or cow dung in meadows, but occasionally feeding some distance up on a grass stalk, even in the hot sun. When at rest it is usually curled sidewise and surrounded with its frass which is of a bright green color. The larva is one of our largest cut-worms, distinguished from all others by the pale amber-colored head and the bronzy hue of the body; the pale dorsal and sub-dorsal stripes always showing distinctly on the dark, highly polished cervical and anal plates. It is referred to by Mr. G. H. French, of Carbondale, Ill., in the *Prairie Farmer* for April, 1878, and also in Professor Thomas's 2d Report on the Insects of Illinois (7th State Report, for 1877), pp. 99 and 220. We have also referred to it as taken from the stomach of a blue-bird, in the *American Entomologist* Vol. III, p. 205. The larva is found of various sizes in the early spring, some being so large as to prove hibernation in this state, larval hibernation being further established by the occurrence of the specimen in the stomach of a blue bird shot in March, and by our having dug it up in a semi-torpid state last February in Virginia. The species may also hibernate, however, in the imago state, in which it is frequently captured in the winter, especially in the Southern States. The very young larvæ are bright-green with indications of the stripes which characterize the full-grown larva. The eggs have not yet been discovered. Pupation takes place in a naked cell just beneath the surface, and not till June or thereafter even in Missouri, the moth issuing in the autumn.

The wide-spread appearance and injury of the species the present spring, furnishes an excellent illustration of the fact, that species which have never before been looked upon as injurious to agriculture may suddenly become so. The insect has various parasites.

We notice that Mr. Lintner, disregarding the popular name of "bronzy cut-worm," by which we have characterized the larva, proposes to call it the "grass-cutter," on the plea that the term "worm" is, strictly speaking, used for the class Vermes, and should be discarded from entomological nomenclature as applying to larvæ. Such ultra-refined reasoning, could it have any following, would lead to absurd ends. Vulgar names rarely become popular except as they come from the people, and should, when coined by naturalists, be as far as possible specific of some peculiarity that will permit recognition of the object. The term "grass-cutter" is a general one that would equally fit the army worm, the Pyralid larva referred to by Mr. Adams, and dozens of other Noctuid larvæ which are "grass-cutters" and to which the term "cut-worm" has been aptly applied. The term "worm," in the entomological sense, comes from the people and is universally employed by English writers, while its equivalent is employed in the same sense in French, German and other languages. To undertake to eliminate it from the vernacular is to attempt an innovation which will meet with deserved failure, and the impossibility of doing which Mr. Lintner concedes in his necessary use of the terms "army worm," "apple worm," "cabbage worm," etc.

The second worm is a much smaller larva of a dingy color, with large piliferous spots, and evidently belonging to the Pyralidæ. We have also in past years found it in Missouri in pastures, mostly under cow dung, but have not yet reared it to the imago state. It evidently played a considerable part in the injury referred to by Mr. Lintner, and was more common than the Nephelodes in the fields referred to by Mr. Adams. It forms, for transformation, among the grass roots, an elongate pod of silk intermixed and covered on the outside with earth.

Without having seen the specimens it would have been safe to conclude that the reported injury was not from the true army worm, which nevers appears, in destructive numbers, so early in the season in the northern part of New York, and Professor Lintner was rightly led by this reasoning to doubt whether it was that species. So far as we can learn, the Nephelodes larvæ have shown no propensity to travel from field to field as does the true army worm. They will soon disappear, from death or through transformation, and are not likely to attract any further attention the present season. Most of the remedies recommended for the army worm will apply to the Nephelodes larva, a full description of which we append from our notes, in order that it may be distinguished from the *Leucania unipunctata*, the larval changes of which are described in our 8th Mo. Report, pp. 184–5.

NEPHELODES VIOLANS—*Larva:* Larger specimens fully 1.9 inch long, largest in middle of body and tapering slightly each way, especially toward anus. Color brownish-bronze, the surface faintly corrugulate but polished, the piliferous spots obsolete. A darker, highly-polished cervical shield and anal plate. A medio-dorsal and sub-dorsal stripe of a buff, or dull flesh color, each stripe of about equal diameter, (nearly 0.04 inch on middle joints) forming narrower, paler lines on the plates and nearly converging on the anal plate; a similar but somewhat broader substigmatal stripe which is wavy below; between sub-dorsal and stigmatal stripes a faintly indicated pale line dividing the space nearly equally. Venter nearly of same buff color, with a tinge of green. *Head* perpendicular, immaculate, paler than body, rugulose, sub-polished, faintly translucent, pale dingy-olive, the jaws, and sometimes the mouth-parts, darker. Legs and prolegs of same pale olive color, the latter with a black band at outer base. Stigmata black.

The young larva is green but early shows the pale stripes. When about one third grown the general hue is olive-green with the cervical and anal plates but little darker. The head is pale, greenish, faintly freckled and with a few dark hairs; the sutures pale, the mandibles tinged with blood-red and brown at extremeties, and the ocelli distinct on a pale ground, the second and third from below, black, the others light. The three dorsal stripes and the narrower supra-stigmal line are very pale, greenish-yellow, the broader sub-stigmatal stripe of a clearer cream-yellow with a faint carneous tint.

One of the most marked Noctuid larvæ, at once distinguished from all others known to me when full grown by the pale, immaculate head (recalling copal) and the polished, bronzy or umber color of body. The upper stripes are often obsolete or subobsolete in the middle of body, but are persistent on the plates. The bronzy color in paler specimens is due to brown and yellow mottlings, and in dark specimens becomes nearly black; while the stripes are generally minutely mottled with carneous.

Pupa—Normal, dark brown, the tip with two horizontal almost parallel spines.

MIGRATION OF BUTTERFLIES.—Under date of June 2, Dr. J. H. Mellichamp, of Bluffton, S. C., sends the following interesting account of the migration of a butterfly, the species being *Pieris monuste* L., a tolerably common insect in the South. The larva, according to authors, feeds on *Cleome pentaphylla*, and Mr. E. A. Schwarz found it in Texas on *Polanisia trachysperma*. It is colored with faint violet and with citron-yellow stripe, the head, legs and venter being greenish-yellow, both head and body being spotted with black piliferous tubercles, the larger ones in four rows. The chrysalis is pale yellowish, spotted and shaded with brown, and characterized by two black filamentous spines on the middle of the body (fourth abdominal joint). Dr. M. says:

"I enclose specimens of a white butterfly, thousands of which have been steadily passing over this place from west to east (apparently against the wind) both yesterday and to-day. Savannah (Ga.) is west or south west of this place, and I am informed that oats had been destroyed there some two or three weeks ago by a caterpillar. Can this stranger be the parent of the same? Being white, they can be seen at a long distance, and they come along in twos, and threes, and fours and sometimes in a greater number—going steadily east or north-east—seldom stopping ("so hasty" as a darkey would say!), but occasionally alighting on a weed, or shrub, or flower (Gardenia).

Usually they fly at the distance of fifteen or twenty feet from the earth. Most are white, and larger, I think, than the enclosed; a few are darker, like this other specimen. They are shy and wary and very difficult to capture. A colored man said to me that they came in his field "like a swarm of bees," and that he "just couldn't stand it any longer—never saw such a thing in my life,"—and so dropped his hoe and came home!!

CLASSIFICATION OF THE MITES.—In a recent letter Dr. G. Haller, of Bern, Switzerland, already well known through his studies of the Acarina, informs us that, after a great number of examinations, he finds that these curious creatures have not only three pairs of maxillæ and a true labium with palpi, but, as is already known, two pairs of abdominal, as well as cephalothoracic, legs. He does not consider that they belong to the Arachnida, with which they have been hitherto placed, but that they are much more nearly allied to the Crustacea, from which they differ, of course, in breathing through tracheæ instead of gills. He believes they must form a fifth class of Arthropods equivalent to Crustacea, Myriapoda, Arachnida and Hexapoda.

CARRYING OUT THE LAW.—The British Parliament passed, in 1877, an act providing for the imposition of a fine for the person who should import living specimens of the Colorado potato-beetle. That this act did not remain an empty letter is proven by the following case: In February of this year it came to the knowledge of the authorities that a man in Devonshire had in his possession living specimens of the Doryphora, which he had brought over from America, and which he refused to give up. The man was immediately tried, convicted and fined £5, notwithstanding he proved that he had meanwhile killed the beetles. The Devonshire farmers are said to be much dissatisfied at the small amount of the fine, the maximum penalty fixed by law being £10.

LOCUSTS IN MEXICO IN 1880.—We are indebted to Dr. E. Palmer, for the following data concerning the appearances of locusts of unknown species in Mexico last autumn. They appeared during October at Chihuahua, at Saltillo and at Parras. At Saltillo they attacked the winter wheat, which was sufficiently advanced to be injured by them.—*A. S. Packard, Jr.*

ERRATUM.—A rather annoying error crept into the article on Cicada in the last number. On page 481, line fourteen, from bottom, "1860" should be "1660," that being the year of the last simultaneous appearance of the two broods that appear this year.

ANTHROPOLOGY.[1]

ARCHÆOLOGICAL RESEARCHES IN NICARAGUA.—Number 383 of the Smithsonian Contributions is an important addition to our knowledge of Ancient America, entitled "Archæological Researches in Nicaragua," By J. F. Bransford, M. D., Passed Assistant Surgeon, U. S. Navy. Washington City: Published by the Smithsonian Institution, 1881." Dr Bransford made three journeys to Nicaragua, one in 1872, with Commander E. P. Lull, a second in 1876, when several months were spent in archæological explorations, and a third in 1877, at which time the author's investigations were extended to Nicoya, in Costa Rica. Excepting the last named excursions, all the excavations were made on the Island of Ometepec, and to a slight extent near San Jorge on the mainland.

The geology and natural scenery of the island, the lake, and the surrounding country, are so graphically described that the

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[1] Edited by Prof. OTIS T. MASON, Columbian College, Washington, D. C.